RELIABILITY REPORT
FOR
MAX6814XK+
PLASTIC ENCAPSULATED DEVICES

September 22, 2009

MAXIM INTEGRATED PRODUCTS
120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering
Conclusion

The MAX6814XX+ successfully meets the quality and reliability standards required of all Maxim products. In addition, Maxim’s continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim’s quality and reliability standards.

Table of Contents

I. Device Description
   A. General

The MAX6814 is a low-power watchdog circuit in a tiny 5-pin SC70 package. This device improves system reliability by monitoring the system for software code execution errors. When the watchdog input detects a transitional edge, the internal watchdog timer clears and restarts, then begins counting again. If the watchdog timer exceeds the watchdog timeout period (1.6s typ), the active-low, push-pull watchdog output asserts for the watchdog pulse period (140ms min) to alert the system of the fault. The MAX6814 consumes only 4µA of supply current and is fully specified over the extended temperature range.
II. Manufacturing Information

A. Description/Function: 5-Pin Watchdog Timer Circuit
B. Process: B8
C. Number of Device Transistors: 0
D. Fabrication Location: California or Texas
E. Assembly Location: Malaysia, Thailand
F. Date of Initial Production: April 11, 2003

III. Packaging Information

A. Package Type: 5-pin SC70
B. Lead Frame: Alloy42
C. Lead Finish: 100% matte Tin
D. Die Attach: Non-conductive Epoxy
E. Bondwire: Gold (1 mil dia.)
F. Mold Material: Epoxy with silica filler
G. Assembly Diagram: #05-1601-0111
H. Flammability Rating: Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C: Level 1
J. Single Layer Theta Ja: 324°C/W
K. Single Layer Theta Jc: 115°C/W

IV. Die Information

A. Dimensions: 30 X 30 mils
B. Passivation: Si$_3$N$_4$/SiO$_2$ (Silicon nitride/ Silicon dioxide)
C. Interconnect: Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization: None
E. Minimum Metal Width: 0.8 microns (as drawn)
F. Minimum Metal Spacing: 0.8 microns (as drawn)
G. Bondpad Dimensions: 5 mil. Sq.
H. Isolation Dielectric: SiO$_2$
I. Die Separation Method: Wafer Saw
V. Quality Assurance Information

A. Quality Assurance Contacts:
   - Ken Wendel (Director, Reliability Engineering)
   - Bryan Preeshl (Managing Director of QA)

B. Outgoing Inspection Level:
   - 0.1% for all electrical parameters guaranteed by theDatasheet.
   - 0.1% For all Visual Defects.

C. Observed Outgoing Defect Rate:
   - < 50 ppm

D. Sampling Plan:
   - Mil-Std-105D

VI. Reliability Evaluation

A. Accelerated Life Test

The results of the 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (χ) is calculated as follows:

\[
\chi = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 80 \times 2}
\]

(Chi square value for MTTF upper limit)

\[
\text{where } 4340 = \text{Temperature Acceleration factor assuming an activation energy of 0.8eV}
\]

\[
\chi = 13.4 \times 10^{-9}
\]

\[
\chi = 13.4 \text{ F.I.T. (60% confidence level @ 25°C)}
\]

The following failure rate represents data collected from Maxim’s reliability monitor program. Maxim performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maxim-ic.com/qa/reliability/monitor. Cumulative monitor data for the B8 Process results in a FIT Rate of 0.06 @ 25°C and 0.99 @ 55°C (0.8 eV, 60% UCL)

B. Moisture Resistance Tests

The industry standard 85°C/85%RH or HAST testing is monitored per device process once a quarter.

C. E.S.D. and Latch-Up Testing

The MS43-6 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.
Table 1
Reliability Evaluation Test Results

MAX6814XK+

<table>
<thead>
<tr>
<th>TEST ITEM</th>
<th>TEST CONDITION</th>
<th>FAILURE IDENTIFICATION</th>
<th>SAMPLE SIZE</th>
<th>NUMBER OF FAILURES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Static Life Test</strong> (Note 1)</td>
<td>Ta = 135°C Biased Time = 192 hrs.</td>
<td>DC Parameters &amp; functionality</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td><strong>Moisture Testing</strong> (Note 2)</td>
<td>HAST Ta = 130°C RH = 85% Biased Time = 96hrs.</td>
<td>DC Parameters &amp; functionality</td>
<td>77</td>
<td>0</td>
</tr>
<tr>
<td><strong>Mechanical Stress</strong> (Note 2)</td>
<td>Temperature -65°C/150°C Cycle 1000 Cycles Method 1010</td>
<td>DC Parameters &amp; functionality</td>
<td>77</td>
<td>0</td>
</tr>
</tbody>
</table>

Note 1: Life Test Data may represent plastic DIP qualification lots.

Note 2: Generic Package/Process data